Oct. 23, 1956 R. S. RHEEM 2,768,008

INTERLOCKED AND WELDED TANK OUTLET

Filed Feb. 29, 1952

Fig. 1.

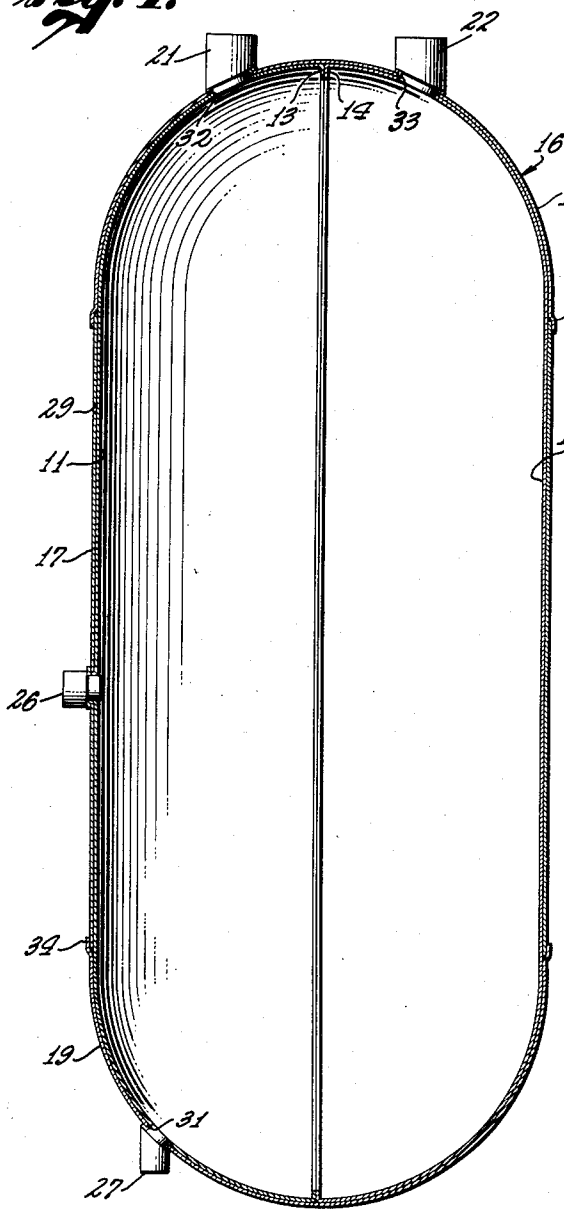


Fig. 4.

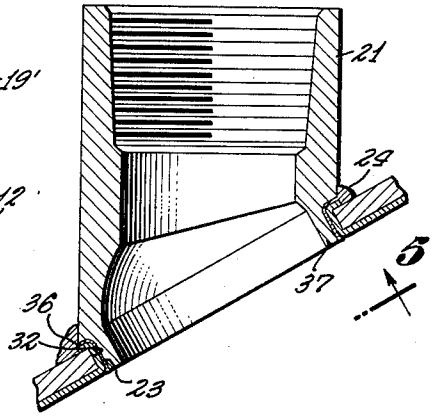


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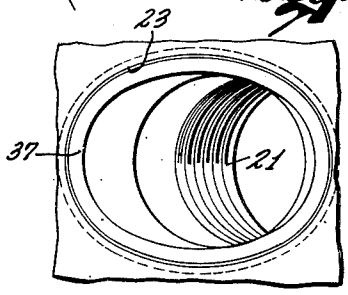
Fig. 5.



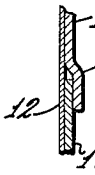
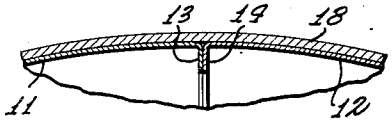




Fig. 3.

Fig. 2.

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2,768,008

# INTERLOCKED AND WELDED TANK OUTLET

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1 Claim. (Cl. 285—179)

This invention relates to the fabrication of innerlined tanks, more particularly water tanks used in domestic water heaters.

It is an object of this invention to provide an improved nipple structure for an innerlined tank, wherein there is communication between the interior of the tank and the nipple without any danger of contact of the outer jacket by the fluid contained in the tank.

When a tank is installed in place by or on behalf of the consumer, there is often considerable twisting applied to the tank nipples as the communication pipes are screwed thereinto. The average plumber generally relies on the bond between the nipple and the tank to prevent the nipple from twisting, and he therefore seldom counters the twisting by a pipe wrench applied directly to the nipple. The result is that the bond between the nipple and the tank is often subjected to such severe torque that the nipple breaks loose from the tank and must be repaired before the installation can be completed. It is a still further object of this invention to provide an improved nipple structure in which twisting of the nipple within the tank opening is positively precluded, and which does not rely on the bond between the nipple and the tank to resist the tightening torque when connecting pipes are screwed onto the nipple.

In accordance with these objects and with other objects which will become apparent hereinafter, the instant invention will now be described in conjunction with the accompanying drawing, wherein:

Fig. 1 is a longitudinal cross-section of a tank constructed in accordance with the instant invention.

Fig. 2 is a fragmentary section taken near the top of the tank showing the character of the internal construction.

Fig. 3 is a fragmentary section taken at the side of the tank, showing further details of construction.

Fig. 4 is a fragmentary vertical section showing one of the connecting nipples at the top of the tank shown in Fig. 1.

Fig. 5 is a fragmentary under side view taken on line 5—5 of Fig. 4.

Referring to the drawings, **11** and **12** designate substantially identical halves of a relatively ductile liner preferably made of copper. These two liner sections are each like a bathtub in shape; that is, each has a semi-cylindrical central portion terminated at each end with quarter spherical portions. Each half section **11** and **12** is identical in construction, and completely around the edges of each section is provided an inwardly turned flange **13**, denoting the flange on the section **11**, and **14** denoting the flange on the section **12**.

Closely and completely surrounding the inner liner composed of the sections **11** and **12**, and of substantially the same shape, is an outer jacket **16** formed of a cylindrical central portion **17** closed at each end by a pair of hemispherical caps **18** and **19**. Each cap is swaged or otherwise outwardly offset as shown at **19'** and **34** to provide a lip which fits closely over the contiguous rim of the cylindrical portion **17**.



The principal function of the copper liner is to provide corrosion resistance to the contents of the tank, for example, water; and the principal function of the jacket **16**, which is preferably made of steel, is to provide mechanical strength and support.

In the upper portion of the tank are provided registering openings in the liner and in the jacket, which accommodate a nipple **21** giving access to the interior of the tank. A similar nipple **22** is provided on the other side of the tank, one nipple being used for inlet purposes and the other for outlet purposes. As best seen in Figs. 1 and 4, the nipples are substantially vertical, whereas the tank wall at the place of opening therein is not horizontal. Therefore, since the nipples are preferably cylindrical in cross-section, the registering openings in the liner and jacket are somewhat elliptical in form as shown in Fig. 5. In this manner the nipple **21**, even though circular, completely fills the opening **23** in the tank. This nipple construction does not require reliance on the weldment **24** to prevent it from twisting within the opening **23**, but such twisting is naturally prevented by the inherent geometry of the bond. This is because any twisting of the nipple brings it into engagement with the wall around the non-circular opening, and such engagement resists further twisting.

Other nipples **26** and **27** are also provided in the tank, nipple **26** being in the cylindrical body portion and adapted to receive a thermostat element, and nipple **27** being at the bottom and adapted to receive a drain cock.

A small opening **29** is formed in the steel jacket for the purpose of testing with air pressure for any leaks in the jacket and this opening is welded closed after the tests. An opening **31** is made in the bottom hemisphere for eventual reception of the drain nipple **27**. The upper hemisphere **18** is also formed with two openings **32** and **33** adapted to receive eventually the two nipples **21** and **22**, respectively. The openings at **31**, **32**, and **33** are elliptical in shape as shown generally in Fig. 5, so that when projected onto a horizontal plane they are circular for reasons which will appear hereinafter.

Each of these openings in the tank is provided with a nipple, in a manner which will now be described, by way of example, in connection with the opening **23** corresponding to the opening **32** in the steel jacket, and with particular reference to Figs. 4 and 5. By means of a suitable swage or flanging tool, the copper rim extending inwardly from the periphery of the opening **32** in the steel jacket is forced through the opening **32** in the hemisphere **18** and is then flanged outwardly around the outside of the jacket, as shown at **36** in Fig. 4.

As seen in Fig. 4, the lower end of the nipple **21** is cut on a bias corresponding to the angle of slope of the tank wall at the opening **23**. A cylindrical flange portion **37** is formed around the bias rim of the nipple **21**, the outside diameter of this flange conforming closely to the diameter of the opening **23** after the edge of the liner **11** has been pressed therethrough and flanged around as shown at **36**. Thus, when the nipple **21** is disposed vertically, as shown in Fig. 4, its flanged portion **37** extends into the opening **23** and completely fills the opening because of the corresponding elliptical geometry between the rim **37** and the opening **23**.

After the nipple **21** is in the position shown in Fig. 4, it is welded completely around its periphery by a weldment **24**. It is preferred to use a welding material having a good wetting ingredient such as silver, so that the weld material flows into the crevice between the flange **37** and the copper liner **11**, and also into the crevice between the copper liner **11** and the edge of the opening **32** in the hemispherical head **18**. Weld material also bonds between the nipple **21** and the steel head **18**. Thus, there is formed a good bond of the nipple to the liner, of the

liner to the head, and of the nipple to the head. In this way the steel jacket **16** is completely protected from contact by the contents of the tank, since the nipple **21** is bonded directly to the copper liner and there is no possibility of contact between jacket and tank contents.

The nipples **22** and **27** are secured in place by a similar process. The nipple **26** is also secured in place by a similar operation, except that the opening may be circular instead of elliptical, the slight cylindrical curvature of the tank at this point being insufficient to require alteration of the circular section of the opening.

While the instant invention has been shown and described herein in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is therefore not to be limited to the details disclosed herein but is to be accorded the full scope of the claim so as to embrace any and all equivalent apparatus.

I claim:

In a cylindrical tank having end walls closing the ends of the tank, at least one of the end walls being curved and having substantially parallel inside and outside surfaces, said one end wall having an elliptical opening formed therein, the walls defining said opening being cylindrical and substantially perpendicular to that portion of said surfaces circumjacent the opening, the longitudinal axis of the opening being directed toward the axis of the tank, a cylindrical nipple of circular cross-section and having a tank adjacent end, the nipple being secured at its tank adjacent end to said one end wall circumjacent said opening and extending outwardly from said outside surface, the axis of the nipple being substantially parallel to the axis of the tank, a cylindrical flange of elliptical cross-section extending from the tank adjacent end of the nipple, said flange extending into the opening and being of a size such that the outside surface of the flange mates with the side walls defining the said opening.




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